532 Rec'd PCT/PTO 22 JUN 2001

FORM PTO-1390
REV. 5-93

US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEYS DOCKET NUMBER
P01,0218

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)
09/868969

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE99/03947	**10 December 1999**	**23 December 1998**

TITLE OF INVENTION
SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

APPLICANT(S) FOR DO/EO/US
Peter Andersen and Hans Van Mameren

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☒ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)) - **UNSIGNED**.

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; **(PTO 1449, Prior Art, Search Report, References).**

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
    (SEE ATTACHED ENVELOPE)

13. ☒ Amendment "A" Prior to Action.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☒ A substitute specification.

15. ☐ A change of address letter attached to the Declaration.

16. ☒ Other items or information:
    a. ☒ Submission of drawings and drawing changes

    b. ☒ EXPRESS MAIL #EL843728186US

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5) 09/868969	INTERNATIONAL APPLICATION NO PCT/DE99/03947	ATTORNEY'S DOCKET NUMBER P01,0218

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO $860.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) $690.00		
No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) $710.00		
Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $1000.00		
International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed		Number Extra	Rate		
Total Claims	11	- 20 =	0	X $ 18.00	$	
Independent Claims	01	- 3 =	0	X $ 80.00	$	
Multiple Dependent Claims				$270.00 +	$	
TOTAL OF ABOVE CALCULATIONS =					$ 860.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)					$	
SUBTOTAL =					$ 860.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					$	
TOTAL NATIONAL FEE =					$ 860.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +						
TOTAL FEES ENCLOSED =					$ 860.00	
					Amount to be refunded	$
					charged	$

a. ☒ A check in the amount of $ 860.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-1519**. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606-6473
CUSTOMER NUMBER 26574

Steve H. Noll
SIGNATURE

Steve H. Noll
NAME

28,982
Registration Number

BOX PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY – CHAPTER II

AMENDMENT "A" PRIOR TO ACTION AND SUBMISSION OF SUBSTITUTE SPECIFICATION

APPLICANT(S):	ANDRESON, P, et al.
ATTORNEY DOCKET NO:	P01,0218
INTERNATIONAL APPLICATION NO:	PCT/DE99/03947
INTERNATIONAL FILING DATE:	10 DEC 1999
INVENTION:	SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Applicants herewith submit an amendment and substitute specification in the captioned PCT application, and respectfully request entry of same prior to examination in the United States National Stage.

IN THE SPECIFICATION

Cancel the specification as filed, and substitute therefore the substitute specification provided herewith.

IN THE CLAIMS

Cancel the claims 1 - 11 as filed and, insert therefore new claims 12 - 22 as follows:

- -What is claimed is:

12. (New) A semi-submersible deadweight cargo vessel with floodable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll-on/roll-off method, the cargo vessel comprising:

a forebody, a stern, at least one electric azimuth rudder propeller, a loading area, diesel engines as main machines and part of a diesel-electric drive system and arranged in the forebody, upper and lower tanks in which the attitude can be trimmed with respect to the cargo by introducing water ballast into the upper and lower tanks, and a transverse thrust device in the forebody in order to improve the maneuverability, whereby the diesel-electric drive system provides power to the at least one electric azimuth rudder propeller arranged under the stern, the loading area is embodied as a planar transport platform, and the at least one azimuth rubber propeller permitting, together with the transverse thrust device, provides precise position control during lowering, even when there is a considerable wind force.

13. (New) The semi-submersible deadweight cargo vessel of claim 12, wherein the azimuth rudder propeller is embodied as an azimuthing double rudder propeller.

14. (New) The semi-submersible deadweight cargo vessel of claim 13,

wherein the transverse thrust device is driven electrically.

15. (New) The semi-submersible deadweight cargo vessel of claim 14, wherein the transverse thrust device can be controlled from a central navigation console in the wheelhouse and from two bridge side wings.

16. (New) The semi-submersible deadweight cargo vessel of claim 15, wherein the flooding and freeing of the bottom and side tanks can be controlled from a control console on the rear side of the wheelhouse.

17. (New) The semi-submersible deadweight cargo vessel of claim 16, wherein switching and signaling boards are accommodated in a sound-insulated machine control room.

18. (New) The semi-submersible deadweight cargo vessel of claim 17, wherein the main machines are provided with sound dampers.

19. (New) The semi-submersible deadweight cargo vessel of claim 18, wherein the diesel engines can be operated with heavy oil having a viscosity of approximately 3,500 s Redwood.

20. (New) The semi-submersible deadweight cargo vessel of claim 19, wherein diesel engines which can be operated with marine diesel oil are provided as auxiliary machines.

21. (New) The semi-submersible deadweight cargo vessel of claim 20, wherein the auxiliary machines are installed on a vibration-damped base.

22. (New) The semi-submersible deadweight cargo vessel of claim 21, wherein the exhaust gas line of the drive system is movably arranged. - -

IN THE ABSTRACT

Cancel the Abstract as filed, and insert therefore on a separate page, the following Abstract of the Disclosure:

- - **ABSTRACT OF THE DISCLOSURE**

A semi-submersible deadweight cargo vessel with floodable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll on/roll-off method. The cargo vessel includes a diesel-electric drive system having as main machines, diesel engines. The diesel-electric drive system drives at least one azimuth rudder propeller, in which a transverse thrust device is provided in the forebody in order to improve the maneuverability and in which the attitude can be trimmed with respect to the cargo by introducing water ballast into upper and lower tanks. The semi-submersible deadweight cargo vessel has high fuel efficiency and good maneuverability. - -

REMARKS

A substitute specification and an Abstract of the Disclosure are provided herewith which make editorial changes in order to conform to standard US practice. A marked-up copy of the specification is also provided reflecting the changes made.

In addition, the claims as filed have been canceled and replaced by new claims that more clearly set forth the subject mater of Applicants' invention.

No new matter has been inserted into the application.

Applicants submit that this application is in proper condition for examination in the United States National Examination Stage, which action is earnestly solicited.

Respectfully submitted,

Steven H. Noll

Steven H. Noll (Reg. No. 28,982)

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Customer Number: 26574

Substitute specification:

- - SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

BACKGROUND OF THE INVENTION

Field of the Invention:

The invention generally relates to a semi-submersible deadweight cargo vessels. In particular, the present invention relates to cargo vessels for transporting large and heavy bulk materials.

Discussion of the Related Art:

Semi-submersible deadweight cargo vessels are used principally for transporting large and heavy bulk materials and are distinguished by a tonnage of far more than 10,000 t. In contrast to conventional cargo vessels in which the cargo is loaded and unloaded with cranes, and which are therefore subject to limits in terms of the dimensions of the freight to be transported, semi-submersible deadweight cargo vessels are particularly suitable for transporting bulky items, for example complete oil drilling platforms, port crane systems or medium-sized to large water vessels or parts thereof. For this purpose, according to the invention, semi-submersible deadweight cargo vessels are composed of a front part in which the drive system and the command and crew rooms are located, and a rear part which is essentially embodied as a hollow-walled float which has ballast tanks and a planar transport platform.

By flooding the ballast tanks it is possible to submerge the semi-submersible deadweight cargo vessel to such an extent that the transport platform sinks below the water line so that floatable cargo, or cargo which is loaded on a pontoon for example, can be placed on it or removed from it. Conversely, by freeing the ballast tanks it is

possible to raise the transport platform under the cargo to be transported in order to load on said cargo. In addition to this float on/float off method, cargo can also simply be loaded and unloaded with what is referred to as the roll on/roll off method by raising or lowering the transport platform of the semi-submersible deadweight cargo vessel to the level of the quay.

It is known to provide cargo vessels with an electric vessel's drive. In diesel-electric systems, the electric propeller motor is usually supplied by generators which are driven by diesel engines and/or gas turbines. A diesel-electric drive requires higher investment costs in comparison with diesel engines which are coupled directly to the vessel's propeller, but it provides the advantage or more efficient use and makes possible a high torque on the propeller shaft, even under very large load conditions. In addition, with diesel-electric drives there is no risk of inadequate machine control if the propeller leaves the water, for example in rough seas.

In conventional diesel-electric drives, all the electric parts of the system are accommodated inside the vessel, and engines, gear mechanisms and drive shafts are aligned flush with one another. Other unsatisfactory aspects of this are the occurrence of high mechanical and hydrodynamic losses and restricted maneuverability in comparison with propellers which are driven from outside the vessel. A comparatively uneconomical consumption of fuel is also disadvantageous.

The periodical Schiff & Hafen, issue 11/1979, discloses a semi-submersible vessel in the article "Condock I" for carrying lighters or floating containers, which vessel is designed with floatable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll-on/roll-off method, and has, as

main machine, a diesel engine in the rear part of the vessel. In order to improve the maneuverability, a transverse thrust device is provided in the forebody.

The object of the invention is to disclose a semi-submersible vessel which can keep its position without the aid of tugs or anchors and which has a large, planar loading platform suitable for carrying bulky goods.

The object is achieved in that the diesel engines are part of a diesel-electric drive system, the diesel-electric drive system being arranged in the forebody and supplying power to at least one electric azimuth rudder propeller arranged under the stern, the loading area being embodied as a planar transport platform and the azimuth rudder propellers permitting, together with the transverse thrust device, precise position control during lowering, even when there is a considerable wind force.

It is advantageous to arrange the diesel-electric drive system in the forebody so that optimum utilization is made of the space available on the vessel with respect to the transportation suitability of the deadweight cargo vessel. An arrangement of the essential pieces of equipment in the forebody ensures maximum possible variability for loading and unloading cargo onto and off the transport platform in the afterbody, which is not subject to any structural restrictions in this way.

It is also advantageous to drive the azimuth rudder propeller by means of an electric motor which is arranged outside the vessel and which is fed by at least one generator driven by the main machines. The use of electric motors which are arranged outside the vessel for driving one or more azimuth rudder propellers provides the advantage of particularly good maneuverability. This drive technology which is known in practice under the designation SSP is distinguished in this case by a low level of vessel

resistance with a very wide variety of vessel bodies and does not require any additional cooling because the water flowing around the electric motor has a cooling effect. Furthermore, the SSP drive is associated with low use and maintenance costs. Azimuthing rudder propellers are already known, for example as in the brochure from ABB "Azimuthing Electric Propulsion Drive" but this drive for the types of vessel specified in this brochure was not selected according to the criteria of the design of the loading area and the self-positioning of the vessels equipped with it.

According to a further feature of the invention, the azimuth rudder propeller is embodied as an azimuthing rudder double propeller. Double propellers are associated with higher procurement and maintenance costs in comparison with single screws, but providing two propellers makes it possible to have a smaller propeller diameter, enabling the semi-submersible deadweight cargo vessel to be constructed with a smaller draft, which reduces costs. According to one advantageous development of the invention, the transverse thrust device is also driven electrically, contributing to making the design of the deadweight cargo vessel fuel efficient and cost effective.

In one preferred embodiment, the transverse thrust device in the forebody can be controlled from a central navigation console in the wheelhouse and from two bridge side wings of the semi-submersible deadweight cargo vessel, in order to ensure maximum visibility when maneuvering. This is also promoted if, according to a further advantageous feature of the invention, the flooding and freeing of the bottom and side tanks can be controlled from a control console on the rear side of the wheelhouse.

The switching and signaling boards of the semi-submersible deadweight cargo vessel are expediently accommodated in a sound insulated machine control room in

order to damp the level of sound emitted by the vessel's machinery. For this purpose, it is also advantageous to provide, according to a further feature of the invention, the main machines with sound dampers.

In order to make operating costs particularly low, according to one advantageous development of the invention, the diesel engines can be operated with heavy oil which has a viscosity of approximately 3,500 s Redwood. Low operating costs are also promoted if, according to one further advantageous development of the invention, diesel engines which can be operated with marine diesel oil are provided as auxiliary machines. The auxiliary machines are advantageously installed here on a vibration damped base so that a minimum possible noise level is generated.

According to one further feature of the invention, the exhaust gas line of the drive system is movably arranged in order to ensure maximum possible variability with respect to operating of lines in a favorable way with respect to sounds.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a side view of a semi-submersible deadweight cargo vessel;

Fig. 2 shows a plan view of the semi-submersible deadweight cargo vessel; and

Fig. 3 shows a side view of an azimuth rudder double propeller.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

The semi-submersible deadweight cargo vessel illustrated in figures 1 and 2 has an overall length of 156 m. The length between the casting lengths is 145 m. The cargo deck has a length of 126 m, a width of 32.26 m and a free cargo area of approximately 4,065 m2. The height of the sides in the vicinity of the cargo deck is 10 m, while the draft of the semi-submersible deadweight cargo vessel is 7.50 m with freeboard and

19.0 m with the cargo deck lowered.

The semi-submersible deadweight cargo vessel has a dead weight of 18,000 t with freeboard. This is composed of 2,000 t heavy oil (HFO 380) which serves as fuel for the main machines, 172 t marine diesel oil which is used as fuel for the auxiliary machines and for which a loading capacity of approximately 200 m3 is present, 300 t fresh water, for which there is a corresponding loading capacity of 300 m3, 25 t lubricating oil, 20 t supplies for the crew, 20 t spare parts and 15,463 t payload. The average molded draft is approximately 7.5 m with this dead weight in sea water with a specific density of 1,025 t/m3. This corresponds to the draft with freeboard.

The semi-submersible deadweight cargo vessel also has a loading capacity of approximately 40 m3 for dirty oil and of approximately 5 m3 for waste water. Accommodation for 22 crew members and 16 passengers is provided in the forebody, above the foredeck. 3 diesel engines with a rotational speed of approximately 720 min-1, which serve as the main machines, are also arranged on the forebody. With the diesel engines which are embodied as 9 cylinder series mounted machines it is possible to generate electrical power of approximately 3,645 kW each. With electrical losses of approximately 8.7% of the generator when driving, and without supplying the vessel's electrical system, a power of 8,675 kW can thus be made available.

The semi-submersible deadweight cargo vessel is also equipped with two auxiliary machines, embodied as diesel engines, for generating power for the vessel's electrical system, said machines supplying a generator power of 720 kW each with a rotational speed of 720/900 min-1. A third diesel generator, which has a rotational speed of 1800 min-1 and a generator power in accordance with the SOLAS regulations

is provided for when the vessel is docked and for emergencies.

Two azimuth rudder double propellers, which are each driven by means of electric motors arranged outside the vessel and can generate an operating speed of 14 kn are used as the vessel's drive. This drive, which is referred to as an SSP drive (illustrated in fig. 3) is supplemented by two electrically driven transverse thrust devices which improve the maneuverability and stability of the deadweight cargo vessel. Trials have shown that the lowered deadweight cargo vessel can be readily controlled precisely against a wind force of 6 to 7 Beaufort using the two transverse thrust devices.

A multiplicity of winches are provided for fastening the cargo on the cargo deck. Sound protection measures, for example the spatial separation of machine rooms and accommodation, noise-proofing encapsulation of the accommodation on the foredeck or sound damping for the main machines, ensure ergonomic working conditions. The semi submersible deadweight cargo vessel can be lifted from the lowered draft of 18 m to a draft of 7.50 m within 4 hours by pumping empty the ballast tanks using compressed air.

As a result of the low consumption by the main machines of 46.98 mT/24 hr it is possible for the semi-submersible deadweight cargo vessel, which can also be a dock vessel depending on the application, to be at sea for a period of 34.6 days longer, basing the calculation on 360 days, than comparable conventional vessels. This means that additional cargo can be transported for the same operating costs. The high fuel efficiency is also due to the fact that, depending on requirements, just one or two diesel engines of the main machines are operated. Last but not least this also allows for ecological factors.

Although modifications and changes may be suggested by those skilled in the art

to which this invention pertains, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications that may reasonably and properly come under the scope of their contribution to the art. - -

This redlined draft, generated by CompareRite (TM) - The Instant Redliner, shows the differences between -
original document : A:\SMN2002B.DOC
and revised document: C:\WINDOWS\DESKTOP\P01,0218 SUBSTITUTE SPECIFICATION.DOC

CompareRite found 26 change(s) in the text

Deletions appear as Overstrike text surrounded by {}
Additions appear as Bold text surrounded by []

[Substitute specification:]~~{Description}~~

[- - SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

BACKGROUND OF THE INVENTION

Field of the Invention:

The invention generally relates to a semi]-submersible deadweight cargo ~~{vessel}~~ **[vessels. In particular, the present invention relates to cargo vessels for transporting large and heavy bulk materials.]**

~~{The invention relates to a semi-}~~**[Discussion of the Related Art:**

Semi-]submersible deadweight ~~{cargo vessel. Such}~~ cargo vessels are used principally for transporting large and heavy bulk materials and are distinguished by a tonnage of far more than 10,000 t. In contrast to conventional cargo vessels in which the cargo is loaded and unloaded with cranes, and which are therefore subject to limits in terms of the dimensions of the freight to be transported, semi-submersible deadweight cargo vessels are particularly suitable for transporting bulky items, for example complete oil drilling platforms, port crane systems or medium-sized to large water vessels or parts thereof. For this purpose, according to the invention, semi-submersible deadweight cargo vessels are composed of a front part in which the drive system and the command and crew rooms are located, and a rear part which is essentially embodied as a hollow-walled float which has ballast tanks and a planar transport platform.

By flooding the ballast tanks it is possible to submerge the semi-submersible deadweight cargo vessel to such an extent that the transport platform sinks below the water line so that floatable cargo, or cargo which is loaded on a pontoon for example, can be placed on it or removed from it. Conversely, by freeing the ballast tanks it is possible to raise the transport platform under the cargo to be transported in order to load on said cargo. In addition to this float ~~{-}~~on/float ~~{-}~~off method, cargo can also simply be loaded and unloaded with what is referred to as the roll ~~{-}~~on/roll ~~{-}~~off method by raising or lowering the transport platform of the semi-submersible deadweight cargo vessel to the level of the quay.

It is known to provide cargo vessels with an electric vessel's drive. In diesel-electric systems, the electric propeller motor is usually supplied by generators which are driven by diesel engines and/or gas turbines. A diesel-electric drive requires higher investment costs in comparison with diesel engines which

are coupled directly to the vessel's propeller, but it provides the advantage or more efficient use and makes possible a high torque on the propeller shaft, even under very large load conditions. In addition, with diesel-electric drives there is no risk of inadequate machine control if the propeller leaves the water, for example in rough seas.

In conventional diesel-electric drives, all the electric parts of the system are accommodated inside the vessel, and engines, gear mechanisms and drive shafts are aligned flush with one another. Other unsatisfactory aspects of this are the occurrence of high mechanical and hydrodynamic losses and restricted maneuverability in comparison with propellers which are driven from outside the vessel. A comparatively uneconomical consumption of fuel is also disadvantageous.

The periodical Schiff & Hafen, issue 11/1979, discloses a semi-submersible vessel in the article "Condock I" for carrying lighters or floating containers, which vessel is designed with floatable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll-on/roll-off method, and has, as main machine, a diesel engine in the rear part of the vessel. In order to improve the maneuverability, a transverse thrust device is provided in the forebody.

The object of the invention is to disclose a semi-submersible vessel which can keep its position without the aid of tugs or anchors and which has a large, planar loading platform suitable for carrying bulky goods.

The object is achieved in that the diesel engines are part of a diesel-electric drive system, the diesel-electric drive system being arranged in the forebody and supplying power to at least one electric azimuth rudder propeller arranged under the stern, the loading area being embodied as a planar transport platform and the azimuth rudder propellers permitting, together with the transverse thrust device, precise position control during lowering, even when there is a considerable wind force.

It is advantageous to arrange the diesel-electric drive system in the forebody so that optimum utilization is made of the space available on the vessel with respect to the transportation suitability of the deadweight cargo vessel. An arrangement of the essential pieces of equipment in the forebody ensures maximum possible variability for loading and unloading cargo onto and off the transport platform in the afterbody, which is not subject to any structural restrictions in this way.

It is also advantageous to drive the azimuth rudder propeller by means of an electric motor which

is arranged outside the vessel and which is fed by at least one generator driven by the main machines. The use of electric motors which are arranged outside the vessel for driving one or more azimuth rudder propellers provides the advantage of particularly good ~~{maneuvrability}~~ **[maneuverability]**. This drive technology which is known in practice under the designation SSP is distinguished in this case by a low level of vessel resistance with a very wide variety of vessel bodies and does not require any additional cooling because the water flowing around the electric motor has a cooling effect. Furthermore, the SSP drive is associated with low use and maintenance costs.

Azimuthing rudder propellers are already known, for example as in the brochure from ABB "Azimuthing Electric Propulsion Drive" but this drive for the types of vessel specified in this brochure { }was not selected according to the criteria of the design of the loading area and the self-positioning of the vessels equipped with it.

According to a further feature of the invention, the azimuth rudder propeller is embodied as an azimuthing rudder double propeller. Double propellers are associated with higher procurement and maintenance costs in comparison with single screws, but providing two propellers makes it possible to have a smaller propeller diameter, enabling the semi-submersible deadweight cargo vessel to be constructed with a smaller draft, which reduces costs. According to one advantageous development of the invention, the transverse thrust device is also driven electrically, contributing to making the design of the deadweight cargo vessel fuel ~~{-}~~efficient and cost ~~{-}~~effective.

In one preferred embodiment, the transverse thrust device in the forebody can be controlled from a central navigation console in the wheelhouse and from two bridge side wings of the semi-submersible deadweight cargo vessel, in order to ensure maximum visibility when maneuvering. This is also promoted if, according to a further advantageous feature of the invention, the flooding and freeing of the bottom and side tanks can be controlled from a control console on the rear side of the wheelhouse.

The switching and signaling boards of the semi-submersible deadweight cargo vessel are expediently accommodated in a sound ~~{-}~~insulated machine control room in order to damp the level of sound emitted by the vessel's machinery. For this purpose, it is also advantageous to provide, according to a further feature of the invention, the main machines with sound dampers.

In order to make operating costs particularly low, according to one advantageous development of

the invention, the diesel {}engines can be operated with heavy oil which has a viscosity of approximately 3,500 s Redwood. Low operating costs are also promoted if, according to one further advantageous development of the invention, diesel engines which can be operated with marine diesel oil are provided as auxiliary machines. The auxiliary machines are advantageously installed here on a vibration {-}damped base so that a minimum possible noise level is generated.

According to one further feature of the invention, the exhaust gas line of the drive system is movably arranged in order to ensure maximum possible variability with respect to operating of lines in a favorable way with respect to sounds.

~~{Further details and advantages of the subject matter of the invention emerge from the following description of a preferred exemplary embodiment. In the associated drawing, in particular:}~~

[BRIEF DESCRIPTION OF THE DRAWINGS]

Fig. 1 shows a side view of a semi-submersible deadweight cargo vessel;

Fig. 2 shows a plan view of the semi-submersible deadweight cargo vessel ~~{according to FIG. 1,}~~**[;]** and

Fig. 3 shows a side view of an azimuth rudder double propeller.

[DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS]

The semi-submersible deadweight cargo vessel illustrated in figures 1 and 2 has an overall length of 156 m. The length between the casting lengths is 145 m. The cargo deck has a length of 126 m, a width of 32.26 m and a free cargo area of approximately 4,065 m2. The height of the sides in the vicinity of the cargo deck is 10 m, while the draft of the semi-submersible deadweight cargo vessel is 7.50 m with freeboard and 19.0 m with the cargo deck lowered.

The semi-submersible deadweight cargo vessel has a dead weight of 18,000 t with freeboard. This is composed of 2,000 t heavy oil (HFO 380) which serves as fuel for the main machines, 172 t marine diesel oil which is used as fuel for the auxiliary machines and for which a loading capacity of approximately 200 m3 is present, 300 t fresh water, for which there is a corresponding loading capacity of 300 m3, 25 t lubricating oil, 20 t supplies for the crew, 20 t spare parts and 15,463 t payload. The average molded draft is approximately 7.5 m with this dead weight in sea water with a specific density of 1,025 t/m3. This corresponds to the draft with freeboard.

The semi-submersible deadweight cargo vessel also has a loading capacity of approximately 40

m3 for dirty oil and of approximately 5 m3 for waste water. Accommodation for 22 crew members and 16 passengers is provided in the forebody, above the foredeck. 3 diesel engines with a rotational speed of approximately 720 min-1, which serve as the main machines, are also arranged on the forebody. With the diesel engines which are embodied as 9 {-}cylinder series {-}mounted machines it is possible to generate electrical power of approximately 3,645 kW each. With electrical losses of approximately 8.7% of the generator when driving, and without supplying the vessel's electrical system, a power of 8,675 kW can thus be made available.

The semi-submersible deadweight cargo vessel is also equipped with two auxiliary machines, embodied as diesel engines, for generating power for the vessel's electrical system, said machines supplying a generator power of 720 kW each with a rotational speed of 720/900 min-1. A third diesel generator, which has a rotational speed of 1800 min-1 and a generator power in accordance with the SOLAS regulations is provided for when the vessel is docked and for emergencies.

Two azimuth rudder double propellers, which are each driven by means of electric motors arranged outside the vessel{

} and can generate an operating speed of 14 kn are used as the vessel's drive. This drive, which is referred to as an SSP drive (illustrated in fig. 3) is supplemented by two electrically driven transverse thrust devices which improve the maneuverability and stability of the deadweight cargo vessel. Trials have shown that the lowered deadweight cargo vessel can be readily controlled precisely against a wind force of 6 to 7 Beaufort using the two transverse thrust devices.

A multiplicity of winches are provided for fastening the cargo on the cargo deck. Sound protection measures, for example the spatial separation of machine rooms and accommodation, noise-proofing encapsulation of the accommodation on the foredeck or sound damping for the main machines, ensure ergonomic working conditions. The semi{-}
submersible deadweight cargo vessel can be lifted from the lowered draft of 18 m to a draft of 7.50 m within 4 hours by pumping empty the ballast tanks using compressed air. [

]As a result of the low consumption by the main machines of 46.98 mT/24 hr it is possible for the semi-submersible deadweight cargo vessel, which can also be a dock vessel depending on the application, to be at sea for a period of 34.6 days longer, basing the calculation on 360 days, than

comparable conventional vessels. This means that additional cargo can be transported for the same operating costs. The high fuel efficiency is also due to the fact that, depending on requirements, just one or two diesel engines of the main machines are operated. Last but not least this also allows for ecological factors.

[Although modifications and changes may be suggested by those skilled in the art to which this invention pertains, it is the intention of the inventors to embody within the patent warranted hereon all changes and modifications that may reasonably and properly come under the scope of their contribution to the art. - -]

PCT WELTORGANISATION FÜR GEISTIGES EIGENTUM
Internationales Büro
INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

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(81) Bestimmungsstaaten: AU, CA, KR, NO, PL, RU, US, europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

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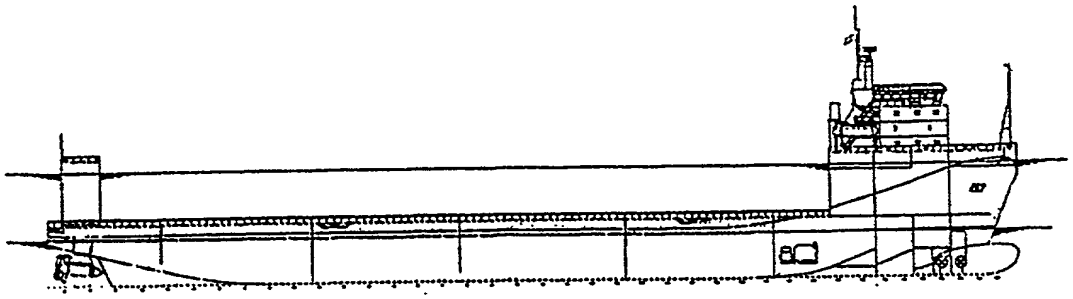
Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.

(54) Title: SEMI–IMMERSIBLE HEAVY–LIFT CARGOBOAT

(54) Bezeichnung: HALBEINTAUCHBARER SCHWERGUTFRACHTER



(57) Abstract

The invention relates to a semi–immersible heavy–lift cargoboat with floodable and freeable bottom and side tanks for loading and unloading cargo according to the float–on/float–off and/or roll–on/roll–off method. Said cargoboat also comprises a diesel–electric driving arrangement. Said heavy–lift cargoboat is provided with diesel engines being the main engines. Said diesel engines drive at least one azimuth rudder propeller. A lateral thrust installation is provided in the forebody in order to improve manoeuvrability. The trimmed attitude can be trimmed in relation to the cargo by placing water ballasting in the upper and lower tanks.

(57) Zusammenfassung

Ein halbeintauchbarer Schwergutfrachter mit flut– und lenzbaren Boden– und Seitentanks zum Be– und Entladen von Frachtgut nach der float–on/float–off– und/oder roll–on/roll–off–Methode und einer dieselelektrischen Antriebsanlage, weist als Hauptmaschinen Dieselmotoren auf, die zumindest einen Azimuth–Ruderpropeller antreiben. Zur Verbesserung der Manövrierfähigkeit ist eine Querschubeinrichtung im Vorschiff vorgesehen. Die Gleichgewichtslage ist durch Einbringen von Wasserballast in obere und untere Tanks bezüglich des Frachtgutes trimmbar.

Description

Semi-submersible deadweight cargo vessel

The invention relates to a semi-submersible deadweight cargo vessel. Such cargo vessels are used principally for transporting large and heavy bulk materials and are distinguished by a tonnage of far more than 10,000 t. In contrast to conventional cargo vessels in which the cargo is loaded and unloaded with cranes, and which are therefore subject to limits in terms of the dimensions of the freight to be transported, semi-submersible deadweight cargo vessels are particularly suitable for transporting bulky items, for example complete oil drilling platforms, port crane systems or medium-sized to large water vessels or parts thereof. For this purpose, according to the invention, semi-submersible deadweight cargo vessels are composed of a front part in which the drive system and the command and crew rooms are located, and a rear part which is essentially embodied as a hollow-walled float which has ballast tanks and a planar transport platform.

By flooding the ballast tanks it is possible to submerge the semi-submersible deadweight cargo vessel to such an extent that the transport platform sinks below the water line so that floatable cargo, or cargo which is loaded on a pontoon for example, can be placed on it or removed from it. Conversely, by freeing the ballast tanks it is possible to raise the transport platform under the cargo to be transported in order to load on said cargo. In addition to this float-on/float-off method, cargo can also simply be loaded and unloaded with what is referred to as the roll-on/roll-off method by raising or lowering the transport platform of the semi-submersible deadweight cargo vessel to the level of the quay.

It is known to provide cargo vessels with an electric vessel's drive. In diesel-electric systems, the electric propeller motor is usually supplied by generators which are driven by diesel engines and/or gas turbines. A diesel-electric drive requires higher investment costs in comparison with diesel engines which are coupled directly to the vessel's propeller, but it provides the advantage or more efficient use and makes possible a high torque on the propeller shaft, even under very large load conditions. In addition, with diesel-electric drives there is no risk of inadequate machine control if the propeller leaves the water, for example in rough seas.

In conventional diesel-electric drives, all the electric parts of the system are accommodated inside the vessel, and engines, gear mechanisms and drive shafts are aligned flush with one another. Other unsatisfactory aspects of this are the occurrence of high mechanical and hydrodynamic losses and restricted maneuverability in comparison with propellers which are driven from outside the vessel. A comparatively uneconomical consumption of fuel is also disadvantageous.

The periodical Schiff & Hafen, issue 11/1979, discloses a semi-submersible vessel in the article "Condock I" for carrying lighters or floating containers, which vessel is designed with floatable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll-on/roll-off method, and has, as main machine, a diesel engine in the rear part of the vessel. In order to improve the maneuverability, a transverse thrust device is provided in the forebody.

The object of the invention is to disclose a semi-submersible vessel which can keep its position without the aid of tugs or anchors and which has a large, planar loading platform suitable for carrying bulky goods.

The object is achieved in that the diesel engines are part of a diesel-electric drive system, the diesel-electric drive system being arranged in the forebody and supplying power to at least one electric azimuth rudder propeller arranged under the stern, the loading area being embodied as a planar transport platform and the azimuth rudder propellers permitting, together with the transverse thrust device, precise position control during lowering, even when there is a considerable wind force.

It is advantageous to arrange the diesel-electric drive system in the forebody so that optimum utilization is made of the space available on the vessel with respect to the transportation suitability of the deadweight cargo vessel. An arrangement of the essential pieces of equipment in the forebody ensures maximum possible variability for loading and unloading cargo onto and off the transport platform in the afterbody, which is not subject to any structural restrictions in this way.

It is also advantageous to drive the azimuth rudder propeller by means of an electric motor which is arranged outside the vessel and which is fed by at least one generator driven by the main machines. The use of electric motors which are arranged outside the vessel for driving one or more azimuth rudder propellers provides the advantage of particularly good maneuvrability. This drive technology which is known in practice under the designation SSP is distinguished in this case by a low level of vessel resistance with a very wide variety of vessel bodies and does not require any additional cooling because the water flowing around the electric motor has a cooling effect. Furthermore, the SSP drive is associated with low use and maintenance costs.

Azimuthing rudder propellers are already known, for example as in the brochure from ABB "Azimuthing Electric Propulsion Drive" but this drive for the types of vessel specified in this brochure

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was not selected according to the criteria of the design of the loading area and the self-positioning of the vessels equipped with it.

According to a further feature of the invention, the azimuth rudder propeller is embodied as an azimuthing rudder double propeller. Double propellers are associated with higher procurement and maintenance costs in comparison with single screws, but providing two propellers makes it possible to have a smaller propeller diameter, enabling the semi-submersible deadweight cargo vessel to be constructed with a smaller draft, which reduces costs. According to one advantageous development of the invention, the transverse thrust device is also driven electrically, contributing to making the design of the deadweight cargo vessel fuel-efficient and cost-effective.

In one preferred embodiment, the transverse thrust device in the forebody can be controlled from a central navigation console in the wheelhouse and from two bridge side wings of the semi-submersible deadweight cargo vessel, in order to ensure maximum visibility when maneuvering. This is also promoted if, according to a further advantageous feature of the invention, the flooding and freeing of the bottom and side tanks can be controlled from a control console on the rear side of the wheelhouse.

The switching and signaling boards of the semi-submersible deadweight cargo vessel are expediently accommodated in a sound-insulated machine control room in order to damp the level of sound emitted by the vessel's machinery. For this purpose, it is also advantageous to provide, according to a further feature of the invention, the main machines with sound dampers.

In order to make operating costs particularly low, according to one advantageous development of the invention, the diesel

engines can be operated with heavy oil which has a viscosity of approximately 3,500 s Redwood. Low operating costs are also promoted if, according to one further advantageous development of the invention, diesel engines which can be operated with marine diesel oil are provided as auxiliary machines. The auxiliary machines are advantageously installed here on a vibration-damped base so that a minimum possible noise level is generated.

According to one further feature of the invention, the exhaust gas line of the drive system is movably arranged in order to ensure maximum possible variability with respect to operating of lines in a favorable way with respect to sounds.

Further details and advantages of the subject matter of the invention emerge from the following description of a preferred exemplary embodiment. In the associated drawing, in particular:

Fig. 1 shows a side view of a semi-submersible deadweight cargo vessel;

Fig. 2 shows a plan view of the semi-submersible deadweight cargo vessel according to FIG. 1, and

Fig. 3 shows a side view of an azimuth rudder double propeller.

The semi-submersible deadweight cargo vessel illustrated in figures 1 and 2 has an overall length of 156 m. The length between the casting lengths is 145 m. The cargo deck has a length of 126 m, a width of 32.26 m and a free cargo area of approximately 4,065 m^2. The height of the sides in the vicinity of the cargo deck is 10 m, while the draft of the semi-submersible deadweight cargo vessel is 7.50 m with freeboard and 19.0 m with the cargo deck lowered.

The semi-submersible deadweight cargo vessel has a dead weight of 18,000 t with freeboard. This is composed of 2,000 t heavy oil (HFO 380) which serves as fuel for the main machines, 172 t marine diesel oil which is used as fuel for the auxiliary machines and for which a loading capacity of approximately 200 m^3 is present, 300 t fresh water, for which there is a corresponding loading capacity of 300 m^3, 25 t lubricating oil, 20 t supplies for the crew, 20 t spare parts and 15,463 t payload. The average molded draft is approximately 7.5 m with this dead weight in sea water with a specific density of 1,025 t/m^3. This corresponds to the draft with freeboard.

The semi-submersible deadweight cargo vessel also has a loading capacity of approximately 40 m^3 for dirty oil and of approximately 5 m^3 for waste water. Accommodation for 22 crew members and 16 passengers is provided in the forebody, above the foredeck. 3 diesel engines with a rotational speed of approximately 720 min^{-1}, which serve as the main machines, are also arranged on the forebody. With the diesel engines which are embodied as 9-cylinder series-mounted machines it is possible to generate electrical power of approximately 3,645 kW each. With electrical losses of approximately 8.7% of the generator when driving, and without supplying the vessel's electrical system, a power of 8,675 kW can thus be made available.

The semi-submersible deadweight cargo vessel is also equipped with two auxiliary machines, embodied as diesel engines, for generating power for the vessel's electrical system, said machines supplying a generator power of 720 kW each with a rotational speed of 720/900 min^{-1}. A third diesel generator, which has a rotational speed of 1800 min^{-1} and a generator power in accordance with the SOLAS regulations is provided for when the vessel is docked and for emergencies.

Two azimuth rudder double propellers, which are each driven by means of electric motors arranged outside the vessel

and can generate an operating speed of 14 kn are used as the vessel's drive. This drive, which is referred to as an SSP drive (illustrated in fig. 3) is supplemented by two electrically driven transverse thrust devices which improve the maneuverability and stability of the deadweight cargo vessel. Trials have shown that the lowered deadweight cargo vessel can be readily controlled precisely against a wind force of 6 to 7 Beaufort using the two transverse thrust devices.

A multiplicity of winches are provided for fastening the cargo on the cargo deck. Sound protection measures, for example the spatial separation of machine rooms and accommodation, noise-proofing encapsulation of the accommodation on the foredeck or sound damping for the main machines, ensure ergonomic working conditions. The semi-submersible deadweight cargo vessel can be lifted from the lowered draft of 18 m to a draft of 7.50 m within 4 hours by pumping empty the ballast tanks using compressed air. As a result of the low consumption by the main machines of 46.98 mT/24 hr it is possible for the semi-submersible deadweight cargo vessel, which can also be a dock vessel depending on the application, to be at sea for a period of 34.6 days longer, basing the calculation on 360 days, than comparable conventional vessels. This means that additional cargo can be transported for the same operating costs. The high fuel efficiency is also due to the fact that, depending on requirements, just one or two diesel engines of the main machines are operated. Last but not least this also allows for ecological factors.

Patent Claims

1. A semi-submersible deadweight cargo vessel with floodable and freeable bottom and side tanks for loading and unloading cargo in accordance with the float-on/float-off and/or roll-on/roll-off method, with diesel engines, as main machines, and a transverse thrust device in the forebody in order to improve the maneuverability, in which the attitude can be trimmed with respect to the cargo by introducing water ballast into upper and lower tanks, characterized in that the diesel engines are part of a diesel-electric drive system, the diesel-electric drive system being arranged in the forebody and supplying power to at least one electric azimuth rudder propeller arranged under the stern, the loading area being embodied as a planar transport platform, and the azimuth rubber propellers permitting, together with the transverse thrust device, precise position control during lowering, even when there is a considerable wind force.

2. The semi-submersible deadweight cargo vessel as claimed in claim 1 claims 1, characterized in that the azimuth rudder propeller is embodied as an azimuthing double rudder propeller.

3. The semi-submersible deadweight cargo vessel as claimed in claim 1 or 2, characterized in that the transverse thrust device is driven electrically.

4. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 3, characterized in that the transverse thrust device can be controlled from a central navigation console in the wheelhouse and from two bridge side wings.

5. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 4, characterized in that

the flooding and freeing of the bottom and side tanks can be controlled from a control console on the rear side of the wheelhouse.

6. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 5, characterized in that switching and signaling boards are accommodated in a sound-insulated machine control room.

7. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 6, characterized in that the main machines are provided with sound dampers.

8. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 7, characterized in that the diesel engines can be operated with heavy oil which has a viscosity of approximately 3,500 s Redwood.

9. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 8, characterized in that diesel engines which can be operated with marine diesel oil are provided as auxiliary machines.

10. The semi-submersible deadweight cargo vessel as claimed in claim 9, characterized in that the auxiliary machines are installed on a vibration-damped base.

11. The semi-submersible deadweight cargo vessel as claimed in one of claims 1 to 10, characterized in that the exhaust gas line of the drive system is movably arranged.

BOX PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY – CHAPTER II

SUBMISSION OF DRAWINGS

APPLICANT(S):	ANDRESON, P, et al.
ATTORNEY DOCKET NO:	P01,0218
INTERNATIONAL APPLICATION NO:	PCT/DE99/03947
INTERNATIONAL FILING DATE:	10 DEC 1999
INVENTION:	SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

Applicants herewith submit one sheet of drawings showing Figures 1 – 3 in he captioned PCT application.

Respectfully submitted,

Steven H. Noll

Steven H. Noll (Reg. No. 28,982)

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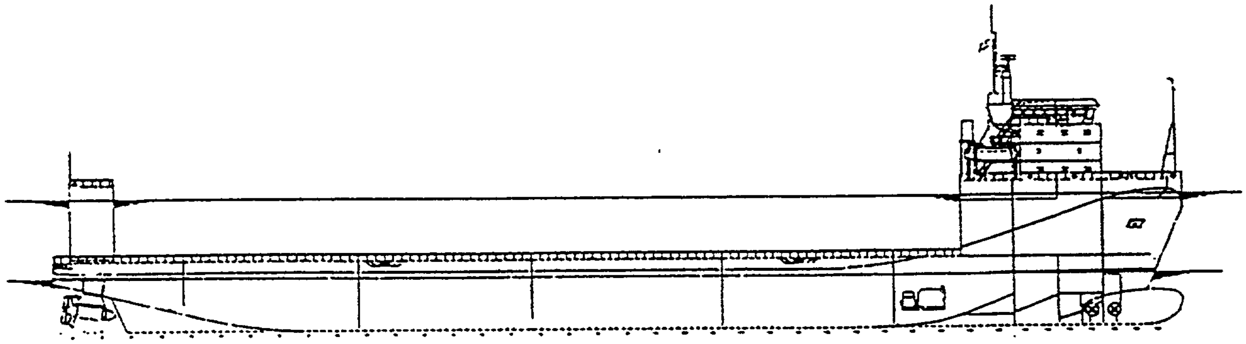

FIG 1

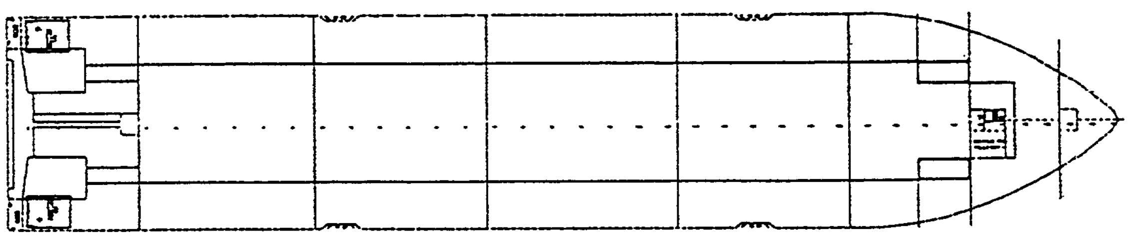

FIG 2

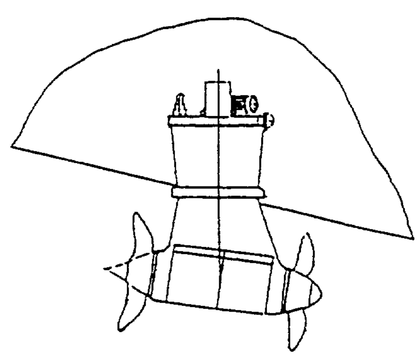

FIG 3

09/868,969

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)	ATTORNEY'S DOCKET NUMBER **P01,0218**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,
I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SEMI-SUBMERSIBLE DEADWEIGHT CARGO VESSEL

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application
Serial No. _____

on _____,

and was amended

on _____(if applicable).

☒ was filed as PCT international application

Number PCT/DE99/03947

on 10 December 1999,

and was amended under PCT Article 19

on _____(if applicable).

I hereby state that I have reviewed and understand the contest of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
Germany	198 60 071.2	23 December 1998	☒ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO
			☐ YES ☐ NO

Combined Declaration For Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NO.
P01,0218

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject mater of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, Untied States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (Check one)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected herewith.

And I hereby appoint all Attorneys identified by the United States Patent & Trademark Office Customer Number 26574, who are all members of the firm of Schiff, Hardin & Waite.

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	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE 26/10/01	DATE 29-10-2001	DATE